

## SEQUENCE LISTING

<110> THE JOHNS HOPKINS UNIVERSITY SCHOOL OF MEDICINE  
LEE, Se-Jin  
HUYNH, Thanh

<120> ANTIBODIES BINDING TO GROWTH DIFFERENTIATION FACTOR-7

<130> JHU1130-2

<140> US 09/412,791

<141> 1999-10-05

<150> US 08/581,528

<151> 1996-01-09

<150> PCT/US94/07799

<151> 1994-07-08

<160> 21

<170> PatentIn version 3.0

<210> 1

<211> 35

<212> DNA

<213> Artificial sequence

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<223> NUCLEOTIDE SEQ ID NO 1 IS CHEMICALLY SYNTHESIZED

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<221> misc\_feature

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<223> n is either g, c, t, or a

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<222> (30)..(30)

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<223> i

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ccggaattcg gntggvanra ytggrtnrtn kncc

35

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<223> n is either g, c, t, or a

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<223> i

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<222> (19)..(19)  
<223> i

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<223> i

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<223> i

<400> 2  
ccggaattcr canscrang mncknacnry cat

33

<210> 3  
<211> 9  
<212> PRT  
<213> Artificial sequence

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<223> PEPTIDE SEQ ID NO 3 IS ENCODED BY SEQ ID NO 1

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<221> VARIANT  
<222> (3)..(3)  
<223> Xaa = His, Gln, Asn, Lys, Asp, or Glu

<220>

<221> VARIANT  
 <222> (4)..(4)  
 <223> Xaa = Asp or Asn

<220>  
 <221> VARIANT  
 <222> (6)..(7)  
 <223> Xaa = Val, Ile, or Met

<220>  
 <221> VARIANT  
 <222> (8)..(8)  
 <223> Xaa = Ala or Ser

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Gly Trp Xaa Xaa Trp Xaa Xaa Xaa Pro  
 1 5

<210> 4  
 <211> 8  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> PEPTIDE SEQ ID NO 4 IS ENCODED BY THE COMPLEMENT OF SEQ ID NO 2

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 <221> VARIANT  
 <222> (2)..(2)  
 <223> Xaa = Val, Ile, Met, Thr, or Ala

<220>  
 <221> VARIANT  
 <222> (4)..(4)  
 <223> Xaa = Arg or Ser

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 <221> VARIANT  
 <222> (5)..(5)  
 <223> Xaa = Ala or Ser

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 <221> VARIANT  
 <222> (7)..(7)  
 <223> Xaa = Gly or Ala

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Met Xaa Val Xaa Xaa Cys Xaa Cys  
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<210> 5  
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<212> DNA  
<213> Mus musculus

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<221> CDS  
<222> (34)..(516)

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Ala Gly Ser Arg Lys Ala Asn  
1 5

ctg ggc ggt cgc agg cgg cgg cgg act gcg ctg gct ggg act cgg gga 102  
Leu Gly Gly Arg Arg Arg Arg Arg Thr Ala Leu Ala Gly Thr Arg Gly  
10 15 20

gcg cag gga agc ggt ggt ggc ggc ggt ggc ggt ggc ggc ggc ggc ggc 150  
Ala Gln Gly Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly Gly  
25 30 35

ggc ggc ggc ggc ggc ggc ggc ggc gca ggc agg ggc cac ggg cgc aga 198  
Gly Gly Gly Gly Gly Gly Gly Gly Gly Ala Gly Arg Gly His Gly Arg Arg  
40 45 50 55

ggc cgg agc cgc tgc agt cgc aag tca ctg cac gtg gac ttt aag gag 246  
Gly Arg Ser Arg Cys Ser Arg Lys Ser Leu His Val Asp Phe Lys Glu  
60 65 70

ctg ggc tgg gac gac tgg atc atc gcg cca tta gac tac gag gca tac 294  
Leu Gly Trp Asp Asp Trp Ile Ile Ala Pro Leu Asp Tyr Glu Ala Tyr  
75 80 85

cac tgc gag ggc gtt tgc gac ttt cct ctg cgc tgc cac ctg gag cct 342  
His Cys Glu Gly Val Cys Asp Phe Pro Leu Arg Ser His Leu Glu Pro  
90 95 100

acc aac cac gcc atc att cag acg ctg ctc aac tcc atg gcg ccc gac 390  
Thr Asn His Ala Ile Ile Gln Thr Leu Leu Asn Ser Met Ala Pro Asp  
105 110 115

gct gcg cca gcc tcc tgc tgc gtg ccc gca agg ctc agt ccc atc agc 438  
Ala Ala Pro Ala Ser Cys Cys Val Pro Ala Arg Leu Ser Pro Ile Ser  
120 125 130 135

att ctc tac atc gat gcc gcc aac aac gtg gtc tac aag cag tac gaa 486  
Ile Leu Tyr Ile Asp Ala Ala Asn Asn Val Val Tyr Lys Gln Tyr Glu  
140 145 150

gac atg gtg gtg gag gcc tgc ggc tgc agg tag 519  
Asp Met Val Val Glu Ala Cys Gly Cys Arg  
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Ala Gly Ser Arg Lys Ala Asn Leu Gly Gly Arg Arg Arg Arg Arg Thr

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<210> 7
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<213> Mus musculus

<400> 7
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Gly Gly Gly Gly Gly Ala Gly Arg Gly His Gly Arg Arg Gly Arg Ser  
1 5 10 15  
Arg Cys Ser Arg Lys Ser Leu His Val Asp Phe Lys Glu Leu Gly Trp  
20 25 30  
Asp Asp Trp Ile Ile Ala Pro Leu Asp Tyr Glu Ala Tyr His Cys Glu  
35 40 45  
Gly Val Cys Asp Phe Pro Leu Arg Ser His Leu Glu Pro Thr Asn His  
50 55 60

Ala Ile Ile Gln Thr Leu Leu Asn Ser Met Ala Pro Asp Ala Ala Pro  
65 70 75 80

Ala Ser Cys Cys Val Pro Ala Arg Leu Ser Pro Ile Ser Ile Leu Tyr  
85 90 95

Ile Asp Ala Ala Asn Asn Val Val Tyr Lys Gln Tyr Glu Asp Met Val  
100 105 110

Val Glu Ala Cys Gly Cys Arg  
115

<210> 8

<211> 123

<212> PRT

<213> Homo sapiens

<400> 8

Arg Pro Arg Arg Asp Ala Glu Pro Val Leu Gly Gly Gly Pro Gly Gly  
1 5 10 15

Ala Cys Arg Ala Arg Arg Leu Tyr Val Ser Phe Arg Glu Val Gly Trp  
20 25 30

His Arg Trp Val Ile Ala Pro Arg Gly Phe Leu Ala Asn Tyr Cys Gln  
35 40 45

Gly Gln Cys Ala Leu Pro Val Ala Leu Ser Gly Ser Gly Gly Pro Pro  
50 55 60

Ala Leu Asn His Ala Val Leu Arg Ala Leu Met His Ala Ala Ala Pro  
65 70 75 80

Gly Ala Ala Asp Leu Pro Cys Cys Val Pro Ala Arg Leu Ser Pro Ile  
85 90 95

Ser Val Leu Phe Phe Asp Asn Ser Asp Asn Val Val Leu Arg Gln Tyr  
100 105 110

Glu Asp Met Val Val Asp Glu Cys Gly Cys Arg  
115 120

<210> 9

<211> 118

<212> PRT

<213> Homo sapiens

<400> 9

Arg Glu Lys Arg Gln Ala Lys His Lys Gln Arg Lys Arg Leu Lys Ser  
1 5 10 15

Ser Cys Lys Arg His Pro Leu Tyr Val Asp Phe Ser Asp Val Gly Trp  
20 25 30

Asn Asp Trp Ile Val Ala Pro Pro Gly Tyr His Ala Phe Tyr Cys His  
35 40 45

Gly Glu Cys Pro Phe Pro Leu Ala Asp His Leu Asn Ser Thr Asn His

<400> 10

<400> 11

Ser	Arg	Gly	Ser	Gly	Ser	Ser	Asp	Tyr	Asn	Gly	Ser	Glu	Leu	Lys	Thr
1				5					10					15	
Ala	Cys	Lys	Lys	His	Glu	Leu	Tyr	Val	Ser	Phe	Gln	Asp	Leu	Gly	Trp
			20					25					30		
Gln	Asp	Trp	Ile	Ile	Ala	Pro	Lys	Gly	Tyr	Ala	Ala	Asn	Tyr	Cys	Asp
		35					40					45			

Gly Glu Cys Ser Phe Pro Leu Asn Ala His Met Asn Ala Thr Asn His  
 50 55 60

Ala Ile Val Gln Thr Leu Val His Leu Met Asn Pro Glu Tyr Val Pro  
 65 70 75 80

Lys Pro Cys Cys Ala Pro Thr Lys Leu Asn Ala Ile Ser Val Leu Tyr  
 85 90 95

Phe Asp Asp Asn Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val  
 100 105 110

Val Arg Ala Cys Gly Cys His  
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<210> 12

<211> 119

<212> PRT

<213> Homo sapiens

<400> 12

Leu Arg Met Ala Asn Val Ala Glu Asn Ser Ser Ser Asp Gln Arg Gln  
 1 5 10 15

Ala Cys Lys Lys His Glu Leu Tyr Val Ser Phe Arg Asp Leu Gly Trp  
 20 25 30

Gln Asp Trp Ile Ile Ala Pro Glu Gly Tyr Ala Ala Tyr Tyr Cys Glu  
 35 40 45

Gly Glu Cys Ala Phe Pro Leu Asn Ser Tyr Met Asn Ala Thr Asn His  
 50 55 60

Ala Ile Val Gln Thr Leu Val His Phe Ile Asn Pro Glu Thr Val Pro  
 65 70 75 80

Lys Pro Cys Cys Ala Pro Thr Gln Leu Asn Ala Ile Ser Val Leu Tyr  
 85 90 95

Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val  
 100 105 110

Val Arg Ala Cys Gly Cys His  
 115

<210> 13

<211> 119

<212> PRT

<213> Homo sapiens

<400> 13

Ser Arg Met Ser Ser Val Gly Asp Tyr Asn Thr Ser Glu Gln Lys Gln  
 1 5 10 15

Ala Cys Lys Lys His Glu Leu Tyr Val Ser Phe Arg Asp Leu Gly Trp  
 20 25 30

Gln Asp Trp Ile Ile Ala Pro Glu Gly Tyr Ala Ala Phe Tyr Cys Asp  
 35 40 45



Gly Glu Cys Ser Phe Pro Leu Asn Ala His Met Asn Ala Thr Asn His  
50 55 60

Ala Ile Val Gln Thr Leu Val His Leu Met Phe Pro Asp His Val Pro  
65 70 75 80

Lys Pro Cys Cys Ala Pro Thr Lys Leu Asn Ala Ile Ser Val Leu Tyr  
85 90 95

Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val  
100 105 110

Val Arg Ser Cys Gly Cys His  
115

<210> 14

<211> 120

<212> PRT

<213> Homo sapiens

<400> 14

Glu Gln Thr Leu Lys Lys Ala Arg Arg Lys Gln Trp Ile Glu Pro Arg  
1 5 10 15

Asn Cys Ala Arg Arg Tyr Leu Lys Val Asp Phe Ala Asp Ile Gly Trp  
20 25 30

Ser Glu Trp Ile Ile Ser Pro Lys Ser Phe Asp Ala Tyr Tyr Cys Ser  
35 40 45

Gly Ala Cys Gln Phe Pro Met Pro Lys Ser Leu Lys Pro Ser Asn His  
50 55 60

Ala Thr Ile Gln Ser Ile Val Arg Ala Val Gly Val Val Pro Gly Ile  
65 70 75 80

Pro Glu Pro Cys Cys Val Pro Glu Lys Met Ser Ser Leu Ser Ile Leu  
85 90 95

Phe Phe Asp Glu Asn Lys Asn Val Val Leu Lys Val Tyr Pro Asn Met  
100 105 110

Thr Val Glu Ser Cys Ala Cys Arg  
115 120

<210> 15

<211> 116

<212> PRT

<213> Homo sapiens

<400> 15

Gly Pro Gly Arg Ala Gln Arg Ser Ala Gly Ala Thr Ala Ala Asp Gly  
1 5 10 15

Pro Cys Ala Leu Arg Glu Leu Ser Val Asp Leu Arg Ala Glu Arg Ser  
20 25 30

Val Leu Ile Pro Glu Thr Tyr Gln Ala Asn Asn Cys Gln Gly Val Cys

35                      40                      45  
 Gly Trp Pro Gln Ser Asp Arg Asn Pro Arg Tyr Gly Asn His Val Val  
     50                      55                      60  
 Leu Leu Leu Lys Met Gln Ala Arg Gly Ala Ala Leu Ala Arg Pro Pro  
     65                      70                      75                      80  
 Cys Cys Val Pro Thr Ala Tyr Ala Gly Lys Leu Leu Ile Ser Leu Ser  
                     85                      90                      95  
 Glu Glu Arg Ile Ser Ala His His Val Pro Asn Met Val Ala Thr Glu  
                     100                      105                      110  
 Cys Gly Cys Arg  
                     115

<210> 16  
 <211> 122  
 <212> PRT  
 <213> Homo sapiens

<400> 16

Ala Leu Arg Leu Leu Gln Arg Pro Pro Glu Glu Pro Ala Ala His Ala  
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 Asn Cys His Arg Val Ala Leu Asn Ile Ser Phe Gln Glu Leu Gly Trp  
                     20                      25                      30  
 Glu Arg Trp Ile Val Tyr Pro Pro Ser Phe Ile Phe His Tyr Cys His  
                     35                      40                      45  
 Gly Gly Cys Gly Leu His Ile Pro Pro Asn Leu Ser Leu Pro Val Pro  
                     50                      55                      60  
 Gly Ala Pro Pro Thr Pro Ala Gln Pro Tyr Ser Leu Leu Pro Gly Ala  
     65                      70                      75                      80  
 Gln Pro Cys Cys Ala Ala Leu Pro Gly Thr Met Arg Pro Leu His Val  
                     85                      90                      95  
 Arg Thr Thr Ser Asp Gly Gly Tyr Ser Phe Lys Tyr Glu Thr Val Pro  
                     100                      105                      110  
 Asn Leu Leu Thr Gln His Cys Ala Cys Ile  
                     115                      120

<210> 17  
 <211> 122  
 <212> PRT  
 <213> Homo sapiens

<400> 17

His Arg Arg Arg Arg Arg Gly Leu Glu Cys Asp Gly Lys Val Asn Ile  
     1                      5                      10                      15  
 Cys Cys Lys Lys Gln Phe Phe Val Ser Phe Lys Asp Ile Gly Trp Asn  
                     20                      25                      30

Asp Trp Ile Ile Ala Pro Ser Gly Tyr His Ala Asn Tyr Cys Glu Gly  
 35 40 45

Glu Cys Pro Ser His Ile Ala Gly Thr Ser Gly Ser Ser Leu Ser Phe  
 50 55 60

His Ser Thr Val Ile Asn His Tyr Arg Met Arg Gly His Ser Pro Phe  
 65 70 75 80

Ala Asn Leu Lys Ser Cys Cys Val Pro Thr Lys Leu Arg Pro Met Ser  
 85 90 95

Met Leu Tyr Tyr Asp Asp Gly Gln Asn Ile Ile Lys Lys Asp Ile Gln  
 100 105 110

Asn Met Ile Val Glu Glu Cys Gly Cys Ser  
 115 120

<210> 18

<211> 121

<212> PRT

<213> Homo sapiens

<400> 18 .

His Arg Ile Arg Lys Arg Gly Leu Glu Cys Asp Gly Arg Thr Asn Leu  
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Cys Cys Arg Gln Gln Phe Phe Ile Asp Phe Arg Leu Ile Gly Trp Asn  
 20 25 30

Asp Trp Ile Ile Ala Pro Thr Gly Tyr Tyr Gly Asn Tyr Cys Glu Gly  
 35 40 45

Ser Cys Pro Ala Tyr Leu Ala Gly Val Pro Gly Ser Ala Ser Ser Phe  
 50 55 60

His Thr Ala Val Val Asn Gln Tyr Arg Met Arg Gly Leu Asn Pro Gly  
 65 70 75 80

Thr Val Asn Ser Cys Cys Ile Pro Thr Lys Leu Ser Thr Met Ser Met  
 85 90 95

Leu Tyr Phe Asp Asp Glu Tyr Asn Ile Val Lys Arg Asp Val Pro Asn  
 100 105 110

Met Ile Val Glu Glu Cys Gly Cys Ala  
 115 120

<210> 19

<211> 115

<212> PRT

<213> Homo sapiens

<400> 19

His Arg Arg Ala Leu Asp Thr Asn Tyr Cys Phe Ser Ser Thr Glu Lys  
 1 5 10 15

Asn Cys Cys Val Arg Gln Leu Tyr Ile Asp Phe Arg Lys Asp Leu Gly  
 20 25 30

Trp Lys Trp Ile His Glu Pro Lys Gly Tyr His Ala Asn Phe Cys Leu  
 35 40 45

Gly Pro Cys Pro Tyr Ile Trp Ser Leu Asp Thr Gln Tyr Ser Lys Val  
 50 55 60

Leu Ala Leu Tyr Asn Gln His Asn Pro Gly Ala Ser Ala Ala Pro Cys  
 65 70 75 80

Cys Val Pro Gln Ala Leu Glu Pro Leu Pro Ile Val Tyr Tyr Val Gly  
 85 90 95

Arg Lys Pro Lys Val Glu Gln Leu Ser Asn Met Ile Val Arg Ser Cys  
 100 105 110

Lys Cys Ser  
 115

<210> 20  
 <211> 115  
 <212> PRT  
 <213> Homo sapiens

<400> 20

Lys Lys Arg Ala Leu Asp Ala Ala Tyr Cys Phe Arg Asn Val Gln Asp  
 1 5 10 15

Asn Cys Cys Leu Arg Pro Leu Tyr Ile Asp Phe Lys Arg Asp Leu Gly  
 20 25 30

Trp Lys Trp Ile His Glu Pro Lys Gly Tyr Asn Ala Asn Phe Cys Ala  
 35 40 45

Gly Ala Cys Pro Tyr Leu Trp Ser Ser Asp Thr Gln His Ser Arg Val  
 50 55 60

Leu Ser Leu Tyr Asn Thr Ile Asn Pro Glu Ala Ser Ala Ser Pro Cys  
 65 70 75 80

Cys Val Ser Gln Asp Leu Glu Pro Leu Thr Ile Leu Tyr Tyr Ile Gly  
 85 90 95

Lys Thr Pro Lys Ile Glu Gln Leu Ser Asn Met Ile Val Lys Ser Cys  
 100 105 110

Lys Cys Ser  
 115

<210> 21  
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 <212> PRT  
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<400> 21

Lys Lys Arg Ala Leu Asp Thr Asn Tyr Cys Phe Arg Asn Leu Glu Glu  
 1 5 10 15

Asn Cys Cys Val Arg Pro Leu Tyr Ile Asp Phe Arg Gln Asp Leu Gly

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Trp	Lys	Trp	Val	His	Glu	Pro
	35					Lys
						Gly
						Tyr
						Tyr
						Ala
						Asn
						Phe
						Cys
						Ser
Gly	Pro	Cys	Pro	Tyr	Leu	Arg
	50					Ser
						Ala
						Asp
						Thr
						Thr
						His
						Ser
						Thr
						Val
Leu	Gly	Leu	Tyr	Asn	Thr	Leu
	65					Asn
						Pro
						Glu
						Ala
						Ser
						Ala
						Ser
						Pro
						Cys
Cys	Val	Pro	Gln	Asp	Leu	Glu
						Pro
						Leu
						Thr
						Ile
						Leu
						Tyr
						Tyr
						Val
						Gly
Arg	Thr	Pro	Lys	Val	Glu	Gln
						Leu
						Ser
						Asn
						Met
						Val
						Val
						Lys
						Ser
						Cys
Lys	Cys	Ser				